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CRITICAL TESTS OF PHENOTHIAZINE AS AN ANTHELMINTIC FOR HORSES

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Phenothiazine is generally accepted as being an efficient anthelmintic for the removal of strongylid worms from the horse, but most workers have based their estimate of its efficiency on the difference between pre-treatment and post-treatment egg counts. It has, however, become evident that inhibition of egg production by worms may follow anthelmintic medication; a phenomenon first recognised in 1924 by Mhaskar, who showed that the administration of oil of chenopodium inhibited the production of eggs by hook worms in man for as long as 12 days. Hall and Augustine (1929) also stressed the importance of this factor, and since that time it has become accepted that post-treatment faecal egg counts should be carried on for a sufficiently long period to allow any worms not eliminated by the treatment to regain their powers of egg laying. More recently, Gibson (1945) has shown that egg production by the strongylid worms of horses may be inhibited for as long as 35 days after the end of a course of treatment with 30 1-gramme doses of phenothiazine. It is clear, therefore, that since faecal egg counts alone may give an unreliable estimate of the efficiency of an anthelmintic, wherever possible the findings should be confirmed, using Hall's critical test or the controlled test, in which the worm burden of a treated group of animals is compared *post-mortem* with that of a similar untreated control group. Owing to the relatively high cost of horses and the considerable amount of labour involved in carrying out Hall's critical test on a horse, only very few such tests have been made and it is therefore thought worth while to put on record five which have been carried out at this laboratory.

MATERIAL AND METHODS

Five adult horses, freshly brought in from grass, were each given, by the stomach tube, 30 grammes of dispersable phenothiazine suspended in about a pint of water, followed by another pint of water to wash any phenothiazine suspension remaining in the tube into the stomach. Grahame, Sloan and Morris (1942), and Knowles and Blount (1940), have reported, and work by the writer, as yet unpublished, has shown that the majority of worms are eliminated on the second and third days after phenothiazine treatment, and so in this experiment the number of worms eliminated after treatment was estimated by examination of the faeces passed during the second and third 24-hour periods following dosage. Examination of the whole 20 to 30 lb. of faeces passed daily by each horse proved too time consuming, and so a small sample only was examined, the sample being taken in the following manner. The total daily faecal output was weighed and then well broken up by rubbing between the hands, after which the whole was thoroughly mixed by prolonged turning of the heap. The heap was then divided into two, and each half treated separately. Further mixing of the half sample was carried out and then this was again divided into two, one half being discarded and the other subjected to further mixing. This procedure went on until the final sample weighed about 8 oz. The two 8-oz. samples obtained in this way were carefully examined for the presence of worms, a little at a time being placed in water in a petri dish over a black tile and examined, using a lens. All the worms present were picked out separately and from the total in the 8-oz. samples an estimate of the number of worms passed each day could be made by a simple calculation.

Four days after treatment the horse was slaughtered and the number of worms still left in the caecum and colon were estimated. In only one case were the large intestinal contents examined, previous experience having shown this procedure to be unnecessary, since if the animal is opened immediately after death the worms are found still adhering to the gut wall. Accordingly, the intestine was opened, the contents discarded, and the intestinal wall washed thoroughly under a jet of water. The washings were caught in a fine sieve, the contents of which were examined carefully, a little at a time, in a petri dish and the number of worms washed off the gut wall counted.

RESULTS

Throughout this paper the terms "large strongyles" and "small strongyles" are used for easy reference to the species of worms which were present in the large intestines of the experimental horses. The group of "large strongyles" comprises the species of *Strongylus*, whilst "small strongyles" include species of *Trichonema*, *Triodontophorus*, *Gyalocephalus* and *Oesophagodontus*.

The results obtained in this experiment have been summarised in Table I.

TABLE I

SHOWING THE RESULTS OF CRITICAL TESTS CARRIED OUT ON FIVE HORSES AFTER TREATMENT WITH 30 GRAMMES OF PHENOTHIAZINE

Horse	Number of worms expelled in the faeces		Number of worms remaining in the large intestine		Percentage efficiency	
	Strongyles		Strongyles		Strongyles	
	Large	Small	Large	Small	Large	Small
1	0	3,800	23	0	0	100
2	0	612	45	0	0	100
3	0	8,600	45	1	0	100
4	153	5,842	165	726	48	89
5	33	13,161	118	4,496*	22	70

* *Note.*—496 of these worms were counted individually and the rest by the dilution method.

Horse No. 5 had a large number of small strongyles,

namely, 4,496, present in the large intestine at *post-mortem*. Of these, 496 were mature worms and were counted individually, but the rest were of very small size and were estimated by the dilution method. Examination of a random sample of these 4,000 small worms showed them all to be immature forms. The efficiency of the treatment against mature small strongyles in this horse was, therefore, 96 per cent. and against immature small strongyles 0 per cent.

Discussion

The critical test as a means of evaluation of anthelmintics has been criticised by several workers, Moskey and Harwood (1941) and Sprent (1946a and b), on the grounds that parasites which have been killed by an anthelmintic will be digested as they pass through the gut. Sprent (1946b) has, indeed, shown that if dead *Bunostomum trigonocephalum* are inserted into the duodenum of a sheep through a fistula, they are digested as they pass down the gut, but that rubber strips of a similar size and shape to the hookworms pass through and can all be recovered in the faeces within 48 hours. Although this phenomenon may seriously affect the value of the critical test where worms inhabiting the stomach or small intestine are concerned, it is not likely to be an important factor with worms inhabiting the caecum and colon where the digestive processes appear not to harm worms killed by an anthelmintic. The critical test may, therefore, be used to evaluate accurately anthelmintics acting on the strongylid worms inhabiting the caecum and colon of the horse.

Most workers who have investigated the efficiency of phenothiazine in horses have based their assessment on egg counts, although a few have reported the elimination of worms in the faeces after treatment. Knowles and Blount (1940) counted the number of worms passed by horses after treatment, the number varying from 3,983 to 244,654, but in only a few of these horses was a *post-mortem* examination carried out, in which cases they state "it was possible to confirm that the drug had been thoroughly efficient in removing all the strongyles present." There appear to be only three records in the literature of critical tests of phenothiazine on 17 horses, and these are summarised in Table II.

Leaving aside horse No. 5, it will be seen that the experiments reported in this paper agree with those previously reported concerning the high efficiency of phenothiazine in eliminating small strongyles from the horse. A difference is, however, observed in the efficiency against large strongyles for in the present work efficiency was low, 0 per cent. in three cases and 48 per cent. in the other, but in the work summarised in Table II high efficiency (90 to 100 per cent.) was reported. This difference may be due to the higher doses (50 to 100 grammes) used by previous workers, although Grahame, Sloan and Morris (1942) used doses of 30 and 35 grammes of phenothiazine and reported 92, 100 and 54·5 per cent. efficiency against large strongyles in three horses. It appears, therefore, that 30-gramme doses of phenothiazine have variable efficiency against the large strongyles in the horse whereas doses of 50 to 100 grammes more constantly give higher efficiency.

The results obtained with horse No. 5 in the present series of experiments merit separate consideration. The efficiency of phenothiazine against the large strongyles was low, 22 per cent., and this is in keeping with the other results of this experiment. Efficiency against the small strongyles, however, appeared to be lower than usual, 70 per cent., but the greater proportion of the small strongyles remaining in the gut at *post-mortem* examination were immature, while those eliminated were all mature. Efficiency against the mature small strongyles was 96 per cent.—a figure in agreement with the other results obtained in this experiment. It is generally believed by helminthologists that anthelmintics are less efficient against immature worms than against mature ones, and this appears to apply to the small strongyles, judging from the results obtained with horse No. 5. Although the belief that immature worms are more difficult to remove by anthelmintics than mature ones is very widely held, there is very little experimental evidence showing that this applies to phenothiazine. Gordon (1943) has shown that phenothiazine has relatively low efficiency against immature *Trichostrongylus* spp. in sheep, but in 1940 the same author reported high efficiency against immature *Haemonchus contortus*. The evidence is, therefore, conflicting, but the results obtained with horse No. 5 suggest that a 30-gramme dose of phenothiazine has low efficiency against immature small strongyles and the possibility that for this reason the treatment may require to be repeated after an interval should be kept in mind.

Table II

Showing the Results of Critical Tests of Phenothiazine in Horses which have been Previously Reported

Author	Horse	Dose of phenothiazine grammes	Number of worms expelled in the faeces		Number of worms remaining in the gut		Percentage efficiency	
			Strongyles		Strongyles		Strongyles	
			Large	Small	Large	Small	Large	Small
Harwood, Habermann, Roberts and Hunt, 1940	1	90	37	37,579	3	0	93	100
	2	80	0	14,211	0	0	—	100
	3	80	9	51,531	0	0	100	100
Grahame, Sloan and Morris, 1943	D.85	35	4	58,580	0	200	100	99·4
	A.77	30	6	45,150	5	200	54·5	99·7
	D.19	30	45	11,850	4	0	92	100
Habermann, Harwood and Hunt, 1941	H. 1	90	37	37,579	3	0	92	100
	H. 2	80	0	142,111	0	0	—	100
	H. 3	80	9	51,531	0	0	100	100
	A. 1	80	4	8,930	0	0	100	100
	H. 4	100	10	8,122	1	0	91	100
	H. 5	60	15	32,352	1	0	94	100
	H. 6	50	10	11,319	0	0	100	100
	H. 7	50	32	106,790	1	8	97	100
	H. 8	50	3	1,093	0	0	100	100
	H. 9	60	2	9,908	0	0	100	100
	H.10	50	9	81,962	0	0	100	100

Summary

Critical tests of phenothiazine carried out on five horses, each of which was given 30 grammes of phenothiazine by stomach tube, are reported. At this dosage the drug was highly efficient against mature small strongyles but had little effect on the large strongyles. In one horse, which was carrying large numbers of immature small strongyles, it was observed that these worms were not eliminated by the phenothiazine treatment. There seems little doubt that the high efficiency against the large strongyles reported by previous workers must have been referable to the higher dosage employed by them.

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APHOSPHOROSIS IN YOUNG COWS IN EAST ANGLIA

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The extended investigations of South African workers (Theiler *et al.*, 1924, 1927, 1937) made clear the aetiology of osteomalacia in cattle and showed how the disease could be cured and prevented. The condition has, indeed, been reported from many countries, Australia (Henry, 1912), America (Smidt, 1924; Hart *et al.*, 1927; Eckles *et al.*, 1926), and various European countries (Marek & Wellman, 1932), but in Great Britain singularly few instances have been reported. In part, this is no doubt due to the fact that grossly phosphorus-deficient soils in arable areas are uncommon, although many upland and hill grazings are moderately deficient, but is also due to climatological factors of temperature and rainfall combining to provide herbage of relatively high nutritive value throughout most of the year. Another factor which probably plays a part is the close observation of stock incidental to intensive methods of animal production and the generous provision of supplements which is a traditional feature of stock husbandry in most parts of Britain. Craig and Davies (1943) briefly report a condition in calves which appears to have been diagnosed on pathological grounds as rickets, although the blood inorganic phosphorus and serum calcium values were not abnormal. Recently Hebeler (1949) reported aphosphorosis in two Jersey cows as judged by an enlargement of joints and improvement of the condition following mineral supplementation. Again, the evidence from chemical examination of the blood was entirely negative. In Ireland there seem to be fairly large areas in which the disease is found (Sheehy, 1945; Bishopp, 1946), while the report of a recent discussion (Hunter, 1949) presents biochemical evidence to confirm this diagnosis.

Aphosphorosis in older cattle and rickets in young, growing ruminants is characterised essentially by a marked fall in blood phosphorus generally associated with a rise in serum calcium, a reduced and often depraved appetite, stiffness in gait and general reluctance to move, a staring coat and a general "tucked-up" and miserable appearance.

This communication records such an outbreak in a herd of cattle in East Anglia.

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History and Initial Examination

Early in April, 1949, trouble was reported in a herd of cows near King's Lynn, Norfolk. There were 20 cows in milk, 14 of them bought as in-calf heifers in the preceding autumn and having calving dates from September to March. It was amongst these that the symptoms of aphosphorosis were so marked. The six old cows were apparently unaffected.

The farmer had reported to his veterinary surgeon that many of the young cows were stiff and clearly not thriving. At our first visit it was very plain that a majority of the recently-calved heifers were affected with what appeared to be the typical symptoms of osteomalacia. They showed unsteadiness of gait, walking with short steps; there was a general unwillingness to move, all were in poor condition and a number were scouring. One badly affected animal named "Heather" was found to have the very low serum inorganic phosphorus value of 0·8 mg. per cent., fell over in the yard and had the greatest difficulty in struggling to her feet.

Four of the young cows were bled on this first visit. No oxalated blood was available for examination, but the serum inorganic phosphorus and serum calcium values were:—

	P. (*mg.* %)	*Ca* (*mg.* %)
"Blondie"	1·5	12·0
"Heather"	0·8	15·3
"Bluey"	1·5	13·8
"Bridget"	1·0	14·3

These figures, taken in conjunction with the clinical picture, seemed to establish the nature of the condition beyond doubt. A further series of blood samples was taken from eight other first-lactation cows four days later and showed low blood inorganic phosphorus figures, only three animals having blood inorganic phosphorus values over 2·5 mg. per 100 ml. It was considered by Otto (1932), who reviewed most of the biochemical and clinical data relating to this disease, that blood inorganic phosphorus values of 2·5 mg. per cent. or less in the bovine were diagnostic of aphosphorosis.

Haemoglobin was also estimated on these samples as an index of general health and all values were normal. Although some degree of anorexia was shown by the worst cases, it was interesting to see from the milk records that production had not dropped, but had remained throughout the winter at an average of slightly less than 2 gallons per cow.

Management and Feeding

The cows were given a ration of beet pulp and oil cake ("dairy nuts") while being milked and mangolds and barley straw fed out daily in the field. It was established that during the whole of the preceding winter the herd had had very little natural grazing. This conclusion seemed warranted because there was a small field of 14 acres into which the cows were turned at night and another of 7 acres used mainly during the day. The first was old run-out permanent pasture with practically no clover, the second was a young ley in which there was evidence of good clover establishment. The extent of over-grazing was shown by the fact that both fields were bare in the second week of April, 18 days or more after a spell of warm weather had brought on a burst of spring growth in the district, and indicated how little could have been obtained through the winter months. The main part of the ration was provided by mangolds and barley straw grown on the farm and fed daily at pasture.

The cows were milked in a walk-through type of bail and during milking were given their ration of dampened sugar beet pulp and concentrates. The method of quick machine milking without stripping was practised and was applied with a rigidity which entirely overlooked any variation in rates of feeding of individual cows and, in fact, it was admitted that many animals had insufficient time to finish their ration of sugar beet and protein concentrate.

Analysis of the food for phosphorus gave the following values:—

	g. per 100 g. dry matter.
Sugar beet pulp	0·069
Cattle " Cake "	0·585
Barley straw	0·129
Mangolds	0·221
Pasture	0·396

The only known quantities fed were the approximate daily amounts of sugar beet pulp and " cake " fed in the milking bail, namely, 4 lb. of the former and 2 lb. of the latter. This accounts for an intake of approximately 5·29 g. of phosphorus. From the necessarily imprecise information about the quantities of mangolds and straw fed at pasture we calculated an intake of 3·4 g. P. for mangolds (30 lb.) and 5·2 g. P. for barley straw (10 lb.). This gave a total daily phosphorus consumption of approximately 13·9 g., a figure which is well below the usually accepted one of 20 g. (1945. Report No. 3. National Research Council).

Experimental Observations

It seemed clear that the aphosphorosis was due to an abnormally low intake of this mineral and the opportunity was taken to investigate the best way of overcoming the deficiency.

Unfortunately it was not possible to have an untreated group of affected animals as controls and some difficulty was encountered in obtaining frequent blood samples.

In view of the finding of several workers (Malan & Du Toit, 1932; Hodgson *et al.*, 1948; Louw, 1948) that sterilised boneflour is as effective as any other readily available phosphorus compound in the treatment of this condition, all affected animals were given 2 oz. sterilised boneflour daily, mixed in the feed. In addition, the effect of supplementing the boneflour with a massive dose of vitamin D and a more complete mineral supplement was observed. The time taken for the return to normal blood phosphorus levels and the remission of clinical signs were used as a measure of recovery.

The group treated with vitamin D was included because of the close relationship of this vitamin with phosphorus metabolism and the process of calcification. In view of the lack of grass, and the fact that no hay or other vitamin D-rich foodstuff was fed, there seemed every likelihood that by the end of the winter inadequate amounts of the vitamin were available, since it may fairly be assumed that they had by this time exhausted their natural reserves.

In order to avoid any possibility that the condition might have been complicated by other mineral deficiencies a group receiving a complete mineral mixture was included.

Using the blood inorganic phosphorus values shown by the 12 young cows in the samples taken on April 5th and 9th as a basis of distribution, three groups of four animals were selected and given the following treatment:—

Group	Treatment
1	2 oz. sterilised boneflour per cow per day
2	As Group 1 + 2 × 10^6 I.U. vitamin D orally*
3	" 1 + 1½ oz. daily of complete mineral mixture†

* 50 mg. calciferol dissolved in 20 ml. arachis oil.
† " Churn " Brand No. 105.

Due to delay in obtaining the mineral mixture and boneflour it was not possible to commence the trial until April 25th. On that day the vitamin D was given and the mineral supplementation started.

Two further series of blood samples were obtained at monthly intervals. Table I summarises the results of phosphorus and calcium analyses. Plasma phosphatase estimations were made on two occasions, but the variation within the group was greater than the variation between groups.

Table I

Group and treatment	No. of cows	9.4.49		25.4.49		22.5.49		30.6.49	
		P.	Ca.	P.	Ca.	P.	Ca.	P.	Ca.
1 Boneflour ...	3	2·5	11·6	—	—	4·0	12·5	3·8	15·1
2 Boneflour + vitamin D_2	3	1·4	14·6	2·3	12·9	3·6	11·8	3·8	14·5
3 Boneflour + other minerals ...	4	2·3	13·0	—	—	3·7	11·2	3·7	15·8

One of the animals in Group 1 aborted and was sold in May and a cow in Group 2 was unfortunately not dosed with calciferol. These animals were therefore discarded.

Discussion

The appearance of the animals and their blood mineral composition indicated that recovery occurred in all of them, although even two months later the blood phosphorus values are at the lower end of the normal range. There was no demonstrable effect from giving other minerals as well as phosphorus and calcium (as boneflour). The smallness of the number of animals available makes difficult any evaluation of the effect of the massive dose of vitamin D_2. Unfortunately the cows in groups 1 and 3 were not bled on April 25th, but if the rise in blood phosphorus values from the initial sampling on April 19th to May 22nd be considered, the vitamin D-treated cows showed a mean gain of 86 per cent., while the mean rise in the other two groups was 56 per cent. and 61 per cent. respectively.

It is interesting to see that the inverse relationship between blood inorganic phosphorus and total serum calcium which has been observed when aphosphorosis was induced experimentally in sheep (Auchinachie & Fraser, 1932; Stewart, 1935), but frequently not found in cattle, was also shown by most of the badly affected cattle at the outset of the present study. Analysis of the diet for calcium was not made, but if the usually accepted contents of these feeding-stuffs are used, it appears that the total daily intake of calcium before mineral supplementation began was between 22 g. and 28 g. and thus close to the recommended intake of 25 to 30 g. daily. No adequate explanation is offered for the high calcium levels shown in midsummer unless they indicate the result of the high total calcium

intake then. At this time the cows had improved greatly in condition and had lost all clinical symptoms of aphosphorosis.

Marston (1934) was one of the first to show that there is frequently an intimate relation between low protein intake and phosphorus deficiency and there seems little doubt that much of the loss of weight and general ill-health in these cattle can be attributed to a sub-optimal intake of protein. No hay, no silage, no green feed and little pasture were available, the only material of high protein content being the modest oil cake ration. Indeed, instead of attaining the suggested requirement of 35 g. digestible protein for cows of this age with a mean daily production of 20 lb. milk, the calculated intake was approximately 20 g. digestible protein.

Although the soil on this property is a light, sandy loam and is close to a stretch of country which embraces soils shown to be phosphorus deficient, the phosphorus content of the barley straw, mangolds and pasture grown on this particular property does not reveal any deficiency. It therefore appears that aphosphorosis occurred through an ill-chosen diet whose effects were augmented by unfavourable feeding conditions in the bail.

It is to be presumed that the pathological state would have spontaneously, though gradually, cleared as the intake of phosphorus rose with the grazing of some young leys which were being held in readiness for use in the spring. The administration of boneflour, however, brought about recovery within a few weeks and there is every reason to infer that the regular exhibition of a phosphorus supplement during the winter would in all probability have prevented the trouble.

The circumstances under which this small field experiment was undertaken, with the unavoidably incomplete chemical observations associated with it, indicate plainly enough that the precise extent of any deficiency cannot be stated.

Summary

1. The occurrence in East Anglia is reported of aphosphorosis in a herd composed mainly of down-calving heifers.

2. The condition was characterised by hypophosphataemia, associated with lameness, unthriftiness, inappetence and scouring.

3. The condition occurred during the winter and apparently was due to a diet low in both phosphorus and protein.

4. Recovery of normal blood phosphorus values and remission of the clinical symptoms occurred shortly after the institution of phosphorus supplementation by means of 2 oz. boneflour to each animal per day.

5. Some evidence is presented which indicates that a massive single dose of vitamin D_2 (50 mg. calciferol orally) hastened the return of normal blood inorganic phosphorus.

Acknowledgments.—We are greatly indebted to Mr. H. C. Swann, M.R.C.V.S., for bringing this outbreak to our notice and for his assistance in obtaining blood samples.

One of us (T. K. E.) undertook this work while holding the I.C.I. Fellowship of the Animal Health Trust.

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CLINICAL COMMUNICATION

PENICILLIN IN THE TREATMENT OF TETANUS IN A HORSE

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The following case is reported as it appears to be one in which penicillin definitely assisted in the recovery of a horse from tetanus. The subject was a five-year-old Arab x Basuto grey pony mare. The animal showed lameness in the near hind leg on November 15th and examination revealed a suppurating wound. By probing, it was discovered that a foreign body was present in the wound. The horse was cast on November 19th and the foreign body, which proved to be a piece of wood about the thickness of a pencil and 2 inches long, was removed from the bulb of the heel. The wound was thoroughly cleaned and dressed with penicillin in oil-wax.

Because of the very few cases of tetanus which have been seen here, although such wounds in horses and other animals are common and also because no tetanus antitoxin was available, treatment was confined to careful cleaning and dressing of the wound daily. Healing took place and the wound showed every sign of resolving satisfactorily.

On November 30th, eleven days after the removal of the foreign body, the horse was noted to be unwell in the evening. When seen the following morning the animal was standing in the " trestle leg " attitude. There was an anxious expression on its face with the lips drawn back and flared nostrils. The nictitating membrane extended half way across the eye-ball. The neck was stretched forward with the head extended. The muscles of the neck and legs and hind quarters were rigid. Any attempt to back the horse caused staggering almost to the extent of falling. Slight movement of the jaws was observed and portions of food boluses kept falling out. When presented with water and soft food at a convenient level the horse showed desire for it and actually managed to drink and eat slowly.

The affected foot could not be raised from the ground without causing imminent danger of the horse throwing itself down.

Diagnosis.—Clinically and on history the diagnosis was one of tetanus.

Treatment.—No antitoxin was available, but some was ordered immediately. Meanwhile penicillin treatment was

started on the understanding that *Cl. tetani* is sensitive to penicillin and in the belief that if further toxin production could be reduced the animal might overcome the toxins already present.

When antitoxin became available this was given subcutaneously, as attempts to give it intravenously and epidurally caused alarming inco-ordinated activity on the part of the horse. For this reason also the horse was handled as little as possible and was kept in a darkened box with plenty of bedding. Throughout the course of treatment the animal used the restricted freedom of its jaws for the purpose of feeding and drinking and this undoubtedly contributed to the successful outcome.

The following notes give briefly the treatment and course of the disease:—

December 1st

8.30 a.m. 480,000 units penicillin in oil/wax* subcutaneously.
10.30 a.m. 480,000 units penicillin in oil/wax subcutaneously.
2.30 p.m. 480,000 units penicillin in oil/wax subcutaneously.
5.00 p.m. 700,000 units penicillin in oil/wax subcutaneously.
6.00 p.m. 120,000 units tetanus antitoxin subcutaneously.
8.00 p.m. 100,000 units tetanus antitoxin subcutaneously and 480,000 units penicillin in oil/wax subcutaneously.

Eating slowly at intervals throughout the day.

At midday the nostrils were very "flared" and the neck rigid. The horse was apprehensive.

December 2nd

7.30 a.m. 460,000 units of penicillin in oil/wax subcutaneously.
10.30 a.m. 480,000 units of penicillin in oil/wax subcutaneously.
2.30 p.m. 750,000 units procaine penicillin intramuscularly.
3.00 p.m. 40,000 units tetanus antitoxin subcutaneously.

The animal continued to eat and the neck appeared to be a little relaxed.

December 3rd.

7.30 a.m. 1,650,000 units procaine penicillin intramuscularly.
10.15 p.m. 40,000 units tetanus antitoxin subcutaneously.
900,000 units procaine penicillin subcutaneously.

The horse was eating and moving a little better, the neck flexing and stretching more easily. The legs were so far relaxed that dressing of the wound, which was almost resolved, could be resumed.

December 4th.

8.15 p.m. 1,500,000 units procaine penicillin subcutaneously.

There was now greater relaxation of the jaw and considerably easier movement. The horse managed to eat fairly easily.

December 5th, December 6th and December 7th.—On the evening of each of these days 900,000 units of procaine penicillin were given subcutaneously. Thereafter treatment was discontinued and recovery was uneventful, the horse appearing perfectly normal a week later.

The total amount of penicillin used was made up as follows:—

1st day—2,620,000 units
2nd day—1,690,000 units
3rd day—2,550,000 units
4th day—1,500,000 units
5th day— 900,000 units
6th day— 900,000 units
7th day— 900,000 units

Total 11,060,000 units

* In the early stages of treatment the only penicillin available was in the form of tubes of intramammary injections. The injections were made by fitting the nozzles to a small "Record" needle and squeezing the contents through this. Later procaine penicillin became available.

The total amount of tetanus antitoxin used was made up as follows:—

1st day—220,000 units
2nd day— 40,000 units
3rd day— 40,000 units

Total 300,000 units

REVIEW

[The Comparative Anatomy and Physiology of the Larynx. By E. V. Negus, M.S., F.R.C.S. William Heinemann Medical Books 1949. 30s.]

In this monograph the author, who is Surgeon to the Ear, Nose and Throat Department, King's College Hospital, records the observations he has made and the conclusions he has drawn from a study of the larynx of a very wide range of species. Throughout, his object has been to correlate structure with the special requirements of the animal's mode of life and not to dwell on anatomical minutiae.

The first chapter is concerned with the evolution of the larynx from the simple sphincter mechanism found in fish up to the complex organ of mammals. The occurrence of a simple larynx early in the evolutionary scale where there is no suggestion of voice production gives origin to the author's basic premise, that the larynx is primarily a device protecting the lungs from the ingress of foreign material and not an organ for voice production: phonation is only one of a number of functions secondarily acquired.

One or more chapters are devoted to each of these modifications and deal with olfaction, respiration, deglutition and the control of intrathoracic pressure. At all times the argument is reinforced by reference to the arrangement in different animals. Three chapters are devoted to the production and use of sound by animals. The author finds that animals with very similar larynges make markedly different use of voice production and he believes that mode of life and not structure is the dominant factor in the use made of phonation. He observes that almost any mammal possesses a larynx that is anatomically fitted for the production of a range of sounds as varied as those of human speech. Intelligence and not anatomical perfection must explain the acquisition of this faculty by man alone.

The main part of the book is concluded by a chapter describing the anatomy of the human larynx. In addition there are three appendices based on lectures the author has given to learned societies.

The numerous illustrations are of high quality and form a valuable part of a work which should appeal not only to professional anatomists and physiologists but to all those interested in observing animals.

The publishers and printers have co-operated in producing a book that is a pleasure to read and to handle; they, as well as the author, are to be congratulated.

Weekly Wisdom

Only one deeply imbued with the self-effacing tradition of Civil Service could so clearly yet quietly exhibit his pride in his calling, with scarcely an allusion to its acknowledged and conspicuous virtues—incorruptibility, political impartiality, and laborious devotion to duty. It needs comparison with the circumstances of less favoured nations—a comparison Sir Edward Bridges *is too well mannered to make—if we would appreciate the good fortune of a country that can take these qualities for granted.—Times* editorial comment on "Portrait of a Profession"—Rede Lecture by Sir Edward Bridges, Permanent Secretary to the Treasury.

VICTORIA VETERINARY BENEVOLENT FUND

MEETING OF COUNCIL

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at 10, Red Lion Square, London, W.C.1, on Thursday, April 13th, 1950, witn the President (Mr. Arnold Spicer) in the chair.

There also were present: Professor J. B. Buxton (Treasurer), Major J. J. Dunlop, Mrs. B. W. Hill-Owens (President of the Ladies' Guild), Professor J. McCunn, Lt.-Col. P. J. Simpson (Hon. Secretary), Professor G. H. Wooldridge and Mrs. W. R. Wooldridge. Mr. C. W. Francis, Accountant, was in attendance.

Minutes.—The minutes of the meeting of Council held on December 14th, 1949, having been printed in *The Veterinary Record*, were taken as read and signed as correct.

Apologies for Absence.—Apologies were received from Professor T. G. Browne, Professor R. E. Glover, Mrs. R. E. Glover, Mrs. G. N. Gould, Mr. John Holroyd, Professor W. M. Mitchell, Mr. H. W. Steele-Bodger, Capt. W. Watt, and Capt. A. Whicher.

Correspondence.—The Hon. Secretary reported that a communication had been received from the Veterinary Medical Association of Ireland stating that they were willing to undertake the investigation into fresh cases or old cases receiving assistance from the Fund, and that the Executive Committee had accepted this offer. The action of the Executive Committee was approved.

Nomination of Representative on the Council of the Professional Classes Aid Council.—A letter was read from the Secretary of the Professional Classes Aid Council intimating that the three years for which Mr. A. Spicer was elected to represent this Fund expires in June of this year. Mr. Spicer stated that he no longer wished to serve on such Council and it was unanimously agreed that Lt.-Col. P. J. Simpson be nominated to fill his place. It was also agreed that the sum of £5 5s. be subscribed to the Professional Classes Aid Council and that the subscription to the London Orphan School be increased to a like sum.

Walter Jowett's Trust.—The Hon. Treasurer reported that under the terms of the will of the late Mr. Walter Jowett the Fund had been left a legacy of £200, which was received on December 19th, 1949.

ACCOUNTANT'S REPORT

The following report of the Accountant was read and adopted:—

Since the previous meeting of Council the following donations, etc., have been received:—

Collecting Boxes

	£	s.	d.
Ayrshire Division, V.M.A.	3	0	0
Central Veterinary Society	4	9	6
J. W. Conchie		14	6
H. Gillmor		10	6
C. G. Hopson	3	3	0
Lancashire Veterinary Association	6	17	0
Mid-West Veterinary Association	12	5	3
Southern Counties Veterinary Society ...	1	10	0
Veterinary Investigation Officers, Weybridge	2	15	6
West of Scotland Division	5	16	0
	41	1	3

Donations

	£	s.	d.
"Anonymous"	4	0	0
G. Dunn (non-member)	1	1	0
Kenya Veterinary Medical Association ...	10	0	0
Lancashire Veterinary Association (1949-50)	10	10	0
National Greyhound Racing Club	5	0	0
North Wales Division	25	0	0
North of Ireland Veterinary Medical Assn. ...	10	10	0
Southern Counties Veterinary Association ...	5	5	0
Wellingborough and District Canine Society (per J. J. Dunlop and J. B. Edwards) ...	2	2	0
West of Scotland Division	5	0	0
Yorkshire Veterinary Medical Society ...	5	5	0
	£124	14	3

Christmas Fund Account

The Christmas Appeal in *The Veterinary Record* last December resulted in the sum of £49 2s. being subscribed. This, together with the £150 received from the Victoria Veterinary Benevolent Fund Ladies' Guild, as reported to the Council at its meeting in December, enabled the Executive Committee to distribute the sum of £198 between 32 recipients just before Christmas.

It was resolved, "That the grateful thanks of the Council be sent to the respective donors."

CASES

(i) *Applications.*—The Hon. Secretary reported that the Executive Committee had investigated two new applications and gave the reasons for the Committee not accepting such applications. The action of the Executive Committee was accordingly approved.

(ii) *New Cases.*—No. 272. Mother of a young M.R.C.V.S. who was killed in a motor accident. Temporary grant of £8 13s. 4d. per month given by the Executive Committee.

No. 273. Widow of M.R.C.V.S., aged 41. Immediate grant of £5 and £8 13s. 4d. per month given by the Executive Committee.

The action of the Committee in these two cases was approved.

(iii) *Old Cases.*—No 171. Sister of M.R.C.V.S. The Hon. Secretary reported the death of this recipient which occurred on April 2nd, 1950.

No. 225a. Family of deceased member now self supporting.

No. 260. Daughter of late member.

After investigation, the Executive Committee decided to stop these grants. This action was approved.

No. 256. Widow of member. In this case the War Office demanded the repayment of a sum approximating £25 which it had overpaid on pension.

The Executive Committee granted payment of £20; the married son undertook to make up to the full amount and also to become a subscriber to this Fund of £1 per annum as a token in gratitude for the action taken by the Executive Committee.

The Council confirmed the action taken in this case.

No. 261. Widow. It was agreed by Council that further investigation be made in this case and, if agreed upon by the Executive Committee, the grant be discontinued.

No. 52. Widow. The Hon. Secretary reported the receipt of correspondence between this recipient and the Assistance Board, and it was agreed that no further action could be taken for the time being.

Draft Annual Report, 1949.—The report as presented, with a few minor corrections of printer's errors, was received and adopted for presentation to the annual general meeting.

Fund's Articles of Association, Alteration to Article No. 12.—It was unanimously agreed that the Board of Trade be approached to alter the fixed date of the annual general meeting which is named in the Articles as "The same day as the Annual General Meeting of the R.C.V.S." to "a date within 14 days of the first day of June." The matter was left in the hands of the Executive Committee.

Date of Next Meeting of Council.—It was resolved, "That the date of the next meeting be left in the hands of the Executive Committee."

A vote of thanks to the President ended the meeting.

ABSTRACT

[Initial Therapeutic Trials with Orthobiotic Serum in the Dog. (Trans. title.) BARDACH, M., GORET, P., MERY, F., & MUTEL, A. (1949.) *Rec. Méd. Vét.* **6.** 245–254.]

The authors have observed for some years the effect on dogs of orthobiotic or anti-reticulo-endothelial cytotoxic serum. The animals were classified in three main groups, (1) young or old dogs with infectious or neoplastic disease, including distemper, chronic metritis, maxillary osteomyelitis, salivary fistula, otitis media, chronic bronchitis and mammary tumours, (2) aged dogs, (3) young or old dogs with various symptoms or syndromes including asthma, keratitis, cataract and ovarian dysfunction. Each animal was given one or two courses of three intradermal injections of anti-dog-spleen serum, at three- to four-day intervals, in carefully estimated doses. The amount of serum used was very small, 0·0025 ml., and the authors noted that diluted serum lost its efficacy about three weeks after dilution.

In the three groups it was found that about 60 per cent. of the patients, after one or two courses of treatment, were markedly improved in their general health and vitality. The serum had a rejuvenating effect on senile dogs and rapidly brought an improvement in the general well-being of sick animals. Results were particularly spectacular in the morbid states accompanying senile decay such as cataracts, and amaurosis with keratitis.

I. W. J.

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

FOOT-AND-MOUTH DISEASE:

East Suffolk.—Morston Hall, Trimley St. Martin (May 28th); Alston House, Trimley St. Martin, Ipswich, East Suffolk (June 2nd).

SWINE FEVER:

Lanarkshire.—Western Regional Hospital Board, Hawkhead Piggery, Crookston, Glasgow, S.

* * * * *

Poultry Stock Improvement Congress.—The Eighth Stock Improvement Congress is announced for June 14th at the Holborn Restaurant, London. Commencing at 10.45 a.m., the subject of the Congress will be "Nutrition in relation to stock improvement," and the speakers are Messrs. F. Horner, E. T. Halnan, M.A., G. G. Belfield, and Dr. W. R. Wooldridge, M.SC., M.R.C.V.S.

NOTES AND NEWS

Diary of Events

June 13th.—Scientific Meeting of the Zoological Society of London, Regent's Park, N.W.8, 5 p.m.

June 15th.—Joint Summer Meeting of the Sussex and South-Eastern Divisions, N.V.M.A., at the Wellcome Veterinary Research Station, Frant, 2.30 p.m.

June 15th.—President's Luncheon and Annual General Meeting of Hertfordshire and Bedfordshire Veterinary Society, at High Barnet, Herts (Salisbury Hotel), 1 p.m.

June 16th.—Summer Meeting of the Mid-West Division, N.V.M.A., at Cheddar (Bath Arms Hotel). (See Notice.)

June 17th.—Meeting of the Biochemical Society, in the School of Biochemistry, Tennis Court Road, Cambridge, 11 a.m.

June 21st.—Meeting of the Scottish Metropolitan Branch at the Royal Hotel, Cupar, Fife, 2.30 p.m.

June 22nd.—Central Division, N.V.M.A., Summer Meeting. (See Notice.)

June 29th.—Meeting of Western Counties Division at Royal Clarence Hotel, Exeter, 2 p.m.

June 30th.—Summer Meeting of the Lancashire Division, N.V.M.A. (See Notice).

July 12th and 13th.—Annual General Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region), at Aberystwyth (Veterinary Department, Agricultural Building, Alexandra Road).

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R.C.V.S. Examination

June 22nd.—R.C.V.S. Membership Written Examination.

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N.V.M.A. Council and Committee Meetings

The next Council and Committee meetings of the Association will be held in London on July 12th, 13th and 14th.

The time-table is as follows:—

Wednesday, July 12th, at 36, Gordon Square, W.C.1.
11 a.m. Organising Committee.
2.15 p.m. Veterinary State Medicine Committee.

Thursday, July 13th, at 36, Gordon Square, W.C.1.
10 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Home Appointments Committee.
2.30 p.m. General Purposes and Finance Committee.

Friday, July 14th, at Connaught Rooms, Great Queen St., W.C.2.
11 a.m. **Council Meeting.**

* * * * *

R.C.V.S. Council Election Result

The following result of the ballot of members taken for the election of five members of Council was declared at the 107th Annual General Meeting of the Royal College of Veterinary Surgeons, which was held at the Royal College of Physicians of Ireland, in Dublin, on Wednesday last (June 7th):—

Name.	*Votes*
J. N. Ritchie	1,010
J. F. D. Tutt	758
J. W. Emslie	734
H. Holroyd	652
J. D. Peele	634
(The above-named were declared elected)	
H. Matthews	614
A. A. Forsyth	610
W. R. McKinna	557
A. Spicer	557
P. Mitchell	441
C. A. Foden	270

Representative of University of London

The University of London nominated as the second member representing the University Professor J. B. Buxton, M.A., F.R.C.V.S., D.V.H., for a period of four years.

Professor Buxton previously represented the Royal Veterinary College and Hospital of London. On the College becoming a recognised school of the University it ceased to have the right to nominate a member.

Representative of the Privy Council

Mr. J. Henderson Stewart, M.P., to replace Mr. W. McNair Snadden, M.P., resigned.

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PERSONAL

Births.—Hignett.—On May 31st, 1950, to Pat (*née* Bishop), wife of P. G. Hignett, M.R.C.V.S., a son.

Short.—On May 16th, 1950, in London, to Anne (*née* King), wife of Colonel G. V. Short, M.B.E., M.R.C.V.S., a daughter.

. . . . . .

Marriage.—Loughridge—Baker.—On June 5th, 1950, at Lanteglos, Camelford, Samuel, son of Mr. and Mrs. R. Loughridge, Ballycraig, Finvoy, N. Ireland, to Thelma, daughter of Mr. and Mrs Russell Baker, Worthyvale Manor, Camelford.

. . . . . .

Death.—Smith.—On May 27th, at Guy's Hospital, Dulcie, dearly beloved wife of Sam Smith, M.R.C.V.S., of Horsham, Sussex.

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The International and N.V.M.A. Veterinary Congresses, London, 1949

Commemorative Pictorial Souvenir

The National Veterinary Medical Association takes pleasure in announcing the issue of a pictorial souvenir* of the meetings held jointly in London in August, 1949, of the XIVth International Veterinary Congress and the LXVIIth Annual Conference of the N.V.M.A. Produced in "Record" size, on fine art paper, this 44-page publication gives representative presentation of the scientific sessions, the ceremonial occasions and informal groupings of the delegates and their ladies, together with a number of pleasing photographs of the centres at which these gatherings took place, or which were visited by the participants. The cost of production has necessitated the issue of a limited edition, and application for copies must be made to 36, Gordon Square, London, W.C.1. Members of the Association are entitled to one copy free of charge. The cost of additional copies, and to non-members of the Association, is 5s. post free.

* N.V.M.A. Publication No. 19.

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R.C.V.S. OBITUARY

Collinson, William, M.R.C.V.S., "West Lea," South Anston, Nr. Sheffield. Graduated London, May 17th, 1892. Died May 31st, 1950; aged 79 years.

Cox, Frederick William, Harlow Croft, Ferrers Way, Allestree. Graduated London, July 16th, 1898; Fellowship, May 18th, 1907. Died May 26th, 1950.

. . . . . .

Mr. F. W. Cox, F.R.C.V.S.

Mr. Frederick William Cox, whose death we record above with much regret, was formerly Chief Veterinary Surgeon to the Midland Railway and later to the London Midland and Scottish Railway, retiring in 1933. His headquarters in Derby were in Calvert Street and he had charge of the large establishment of stables on the London Road, as well as of all other stables on the L.M.S. system.

For nearly 19 years Mr. Cox was People's Warden at Derby Cathedral and was highly esteemed by the Provost and the parishioners for the valuable work he did there.

Mrs. Cox died in 1938, and he is survived by three sons, the Rev. Ingram Cox, Vicar of Wollaston, near Stourbridge, Worcestershire, Mr. Lionel Cox and Mr. Gerald Cox, both of whom are on the staff of the British Railways. His only daughter, Miss Winifred Cox, is a well-known teacher of elocution.

Mr. Cox underwent a serious operation in the Derbyshire Royal Infirmary last August and appeared to have made a good recovery.

The Late Mr. W. Collinson

A Tribute

William Collinson, who died recently after a few years of retirement, was an outstanding example of the older school of practitioners. During his professional life, which was spent in country practice, he did much to enhance the dignity of his profession. The ideal of service to his clients was strong within him and he would spare no effort on their behalf. He was a fine horseman in his younger days and all his life he was vitally interested in this field both in sport and practice. Yet he kept himself well informed and up to date in other branches of veterinary science.

It was my privilege to know him well during the last 12 years of his life. His abounding humour, his sense of fair play and his scrupulous honesty were an example to all who came in contact with him.

His passing will be a sad occasion for his many friends and old clients, who showed their affection for him by their numerous and anxious enquiries during his long illness.

W. P.

* * * * *

Investigation and Control of Foot-and-Mouth Disease

Proposed International Centre in England

A five-day meeting of 48 experts of the Food and Agriculture Organisation of the United Nations and of the International Office of Epizootics was held recently in Paris, following the decision to call such a gathering, arrived at after the first meeting on foot-and-mouth disease held by the F.A.O. in London on August 15th, 1949. In its issue of May 30th *The Farmer and Stockbreeder* prints a Reuter special report of the proceedings, recording that at its closing meeting the conference recommended the establishment of an international centre for the study of the virus of foot-and-mouth disease, specifying that the centre would specialise in the examination, immunological classification and maintenance of strains of the virus. They proposed that this centre be located at the Institute of the British Foot and Mouth Disease Research Committee at Pirbright, and that funds from an internatoinal source be made available to assist the necessary expansion and maintenance of the centre. Dr. I. A. Galloway, the British delegate, had previously informed the meeting that he had been authorised to state that his Government was prepared to offer the facilities available at the Institute with the reservation that funds be made available from an international source.

The experts studied observations on immunological and other characteristics of strains of the virus of foot-and-mouth disease with special reference to experimental methods, epizootio.ogy and methods of control, including vaccination presented by I.A. Galloway (United Kingdom), artificial cultivation of foot-and-mouth disease virus for vaccine production presented by H. B. Frenkel (Holland), foot-and-mouth disease in India by S. Datta (India), and a report on foot-and-mouth disease in Mexico submitted by the Government of Mexico.

The meeting noted that with existing means and through the implementation of all appropriate and proved measures, it was possible to protect countries free from infection; to control and eradicate sporadic outbreaks appearing from time to time; and reduce losses, and even eradicate the disease in countries where it exists in an endemic state. The meeting also considered that a regional approach to attack this disease was essential on the basis of conditions peculiar to each area. It therefore strongly recommended that F.A.O. in co-operation with O.I.E. should call regional meetings in the near future for the purpose of establishing regional committees, particularly in enzootic areas, in case they do not already exist, with a view to developing a concerted attack on this disease.

The meeting also considered the question of trained specialists. As there is only a limited number of experts available for advisory purposes on the establishment of the foot-and-mouth disease research or vaccine producing centres, it was urged that governments make such specialists available to other governments upon request. Offers by various governments to provide facilities for training of specialists have already been made. It was also suggested that in certain territories epizootiological surveys of the disease should be made, particularly prior to initiation of any control programme, and that such surveys should be co-ordinated with the work of the proposed international centre.

The meeting also dealt with methods of co-ordinating reporting systems, as it was felt that prompt notification of initial outbreaks in countries hitherto free of disease, of the eventual eradication of the disease, as well as information on the types of strains of virus and periodical statements on the disease position in countries where it is endemic, should be circulated.

The President of the Office International des Epizooties informed

the meeting that the office would be willing to receive such information from all countries, whether members or non-members of the office and to circulate the information immediately to all countries.

The meeting recommended a full investigation towards making vaccines available at a lower cost to facilitate control of the disease.

An international source of funds should be set up to assist countries not in a position to pay for vaccination. It is considered that while vaccines at present in use are effective, research must be continued to increase their effectiveness as well as to improve the methods of application of these vaccines.

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A correspondent to *The Farmers' Gazette*, Dublin, suggests that the threatened breakdown of supplies from the Argentine gives Ireland a great opportunity to increase exports of meat and that this should be accomplished by a State artificial insemination service.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

PANTING IN CATTLE AND DRY COAT IN HORSES

Sir,—As a recent Adviser on Animal Husbandry to the Government of India, after many years of service there, there is no one better qualified to express an opinion on conditions affecting cattle in that country than Sir Frank Ware. I was very glad to see his letter in your issue of the 13th inst. and, as the subject of "dry coat" in racehorses has for years been a perplexing one for those living in tropical climates who are interested in horses, including many of our professional brethren, perhaps you would permit me to make a few remarks on it.

I did not discuss it in my recent letter, as to do so would have made it unduly long and the subject was indeed outside my immediate purpose. It has, however, interested me for many years and I was fortunate when, as Commandant of the Army Veterinary School, Poona, and in charge of its attached hospital, with accommodation for 50 racehorse patients, I had an opportunity to study it, along one particular line, in collaboration with the Chemical Analyser to Government in Bombay. My conclusion, given in an article published in the *R.A.V.C. Journal* of August, 1938, that the use, or rather the abuse, of arsenic as a tonic may have been the cause, was incorrect, but, as far as the animals I was then dealing with were concerned, it was certainly a contributing cause.

I saw my first "panting" cow in 1940 when inspecting the Military Dairy Farm at Agra and well remember exclaiming to the Manager in surprise, "A dry-coated cow"! It was from this start that investigation of "panting" in dairy cattle began and the more I saw of it the more I was convinced that it was almost identical with that seen in dry-coated horses and due to the same cause.

Let me briefly outline the similarity of this condition as seen in horses and cattle.

1. Indigenous cattle are rarely affected whilst among hundreds of Arab racehorses I have seen, there has been only one possible, mild case. I have neither seen nor heard of a case among the pure indigenous breeds, such as the Marwari, Kathiawari, Baluchi, or Unmol.

2. Cattle and horses of mixed or pure European blood are affected and roughly in proportion to the amount of such blood present. A higher concentration of European blood can be obtained in cattle than in racehorses, in which the blood of the Darley Arabian, the Byerley Turk, the Godolphin Barb, as well as that of the imported Royal and other mares, predominates over that of the native English racing pony or "Hobbie" of the England of 250 years ago. The thoroughbred of to-day is, therefore, protected in large measure by the Eastern or semi-tropical blood of his ancestors, and it is this which I think accounts for the fact that, under similar climatic conditions, dry coat is not so common in horses as is the corresponding condition in susceptible cattle. The incidence in horses might, in fact, be compared to that seen in cattle with 50 per cent. Friesian blood.

3. High-milking cattle and thoroughbred horses in training are the most frequent sufferers of their kind. In both the metabolism of large quantities of concentrates for the production of the variety of energy peculiar to each appears to be a dominating factor. It was a feature of the Poona Racing Season of my time that dry-coated horses were most often found in heavy betting stables where animals were kept at a high concert pitch and where I was well aware arsenic was being used as a tonic. This stimulated the appetite and the increase intake of food demanded more fast work, and therefore increased body heat, if animals were to attain a high state of racing fitness.

4. As with affected dry cattle on light or subsistence diet the symptoms in horses—at rest on a reduced diet—gradually abate until breathing is almost normal. The coat also improves in appearance, but there is no cure and, in both, return to hot weather conditions again produces the acute symptoms. That a high rate of metabolism is a governing factor is borne out by the fact that "panting" is very uncommon in pure bred Friesian bulls, which lead an existence comparable with that of the resting racehorse or the dry milking cow.

5. The term "dry coat" applied to severely affected horses aptly describes their appearance and the same name could equally be applied to affected cattle. We know that the horses do not sweat and I believe it is correct to say that work done at the Jennerette Institute, Louisiana, indicated that sweating in affected animals was greatly reduced.

6. Breathing in affected horses is similar to but seldom so distressed as in cattle in which the mouth frequently is wide open and the tongue protruding, while a rate of breathing of 120 to the minute often has been seen.

The subject could be discussed at great length, but I think the above may suffice to establish the close relation of each condition to the other. Incidentally, the fact that in the horse the condition is not preceded by disease supports, in some degree, my belief that in cattle a previous attack of foot-and mouth disease is not essential.

Yours faithfully,
C. M. Stewart.

Dowdstown House,
Maynooth,
Co. Kildare,
Ireland.
May 30th, 1950.

* * * * *

ATTESTATION: IS IT A GOOD POLICY?

Sir,—Mr. Pitcher has started an interesting discussion on this point, but I have been hoping that it would not come to an end before somebody, who had the figures at his disposal, would widen it beyond the confines of Scotland and England.

Mr. Pitcher has pointed out that since the cows in Scotland started to be rid of bovine tuberculosis the human population showed an increase in infection and death from the human type of tuberculosis. This is an interesting discovery, but I do not think that, on these figures alone, we should be swept into the philosophical error summed up in the phrase, *post hoc, propter hoc*. If the increase in human tuberculosis is due to the decrease in bovine tuberculosis in Scotland, similar results would be seen in other countries which have succeeded in eliminating completely tuberculosis in cattle.

Could not somebody supply us with comparative figures from U.S.A., Denmark or the Channel Islands? If we find no increase in human tuberculosis in these countries, it is, I believe, strong evidence that the increase in Scotland is due to causes other than those suggested by Mr. Pitcher.

Yours faithfully,
F. B. Edwards.

"Newgate,"
Llanbrynmair,
Mont.
May 29th, 1950.

* * * * *

BACK TO BARBARISM?

Sir,—To deal with the excess of rabbits in some districts it has just been suggested that steel-toothed traps should again be set in the open. This practice is at present illegal and we should fight tooth and nail to keep it so, but from the number of domestic animals being caught it is evident that the law is not being complied with. If this proposal is carried, any cat or dog is liable to be caught and will suffer intolerable agony for hours and even days unless help is at hand to release it, sometimes to lie injured and helpless, until merciful death puts an end to its suffering.

The way to stop this flouting of the law is for people with a conscience to report to the police any traps seen set in the open or to send evidence to me.

Yours faithfully,
R. H. Johns,
Secretary.

The National Canine Defence League,
8, Clifford Street,
New Bond Street,
London, W.1.